

A Genomics Bull Buying Guide — The Value of Accuracy

Genomic testing increases EPD accuracy and increases producers confidence in young herd sires.

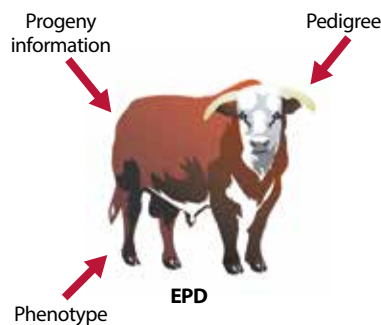
By **Jamie T. Courter, Ph.D.**

As we enter spring bull buying season, producers must arm themselves with information to make educated purchasing decisions. Information here expands on an article in the January 2020 *Hereford World* that provides selection tips to keep in mind as you flip through sale catalogues searching for bulls. Specifically, here you will find detailed information about one topic — accuracy.

Last year's "A Genomics Bull Buying Guide" article defined expected progeny differences (EPDs), the accuracy of EPDs and the percentile rank. An EPD is an estimate of the genetic merit an animal will pass on to its progeny, on average. EPDs can be used when sorting animals according to their potential to make genetic change within a herd, or when making bull buying decisions. A percentile rank simply reports where the specific EPD for that animal ranks across the entire breed on a scale of 1 to 100 with 1 being the top and 100 the bottom.

Traditional EPDs are calculated using individual pedigrees, phenotypes for key traits of interest and progeny information (Figure 1). Seedstock producers are heavily invested in reporting this data. Accuracy, reported on a scale of 0 to 1, is an estimate of the confidence that the EPD provided is the "true" EPD of the animal. As more progeny records and phenotypes on an animal are reported, geneticists inherently know more about that animal. This

Figure 1: Sources of information used to calculate an EPD



results in the EPD fluctuating up and down over time, as the accuracy increases.

The American Hereford Association's (AHA) genomic-enhanced expected progeny differences (GE-EPDs) incorporate genomic information to an existing pedigree-based evaluation. This added genomic data has several impacts, with the most important being an immediate increase in the accuracy of the prediction. GE-EPDs are noted by the AHA GE-EPD logo.

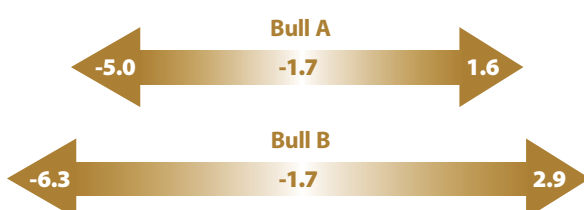
Visualizing accuracy

Figure 2 helps producers picture what is meant by "increased confidence" in an EPD with increased accuracy. The image includes Birth Weight (BW) EPD information for two different yearling bulls. Notice that while they have the same EPD for BW (-1.7 lbs) — thus the same percentile rank in the breed (3%) — the accuracy is higher for Bull A than Bull B.

Figure 2: The impact of accuracy on the 95% confidence interval of an EPD.

	Birthweight	
	Bull A	Bull B
EPD	-1.7	-1.7
ACC	0.39	0.15
Percentile rank	3%	3%

Figure 3: The possible range of "true" EPDs



This is because Bull A has been genotyped while Bull B has not. Just looking at their respective EPDs, both animals would be considered calving ease bulls, and could be purchased as such. However, the second image (Figure 3) represents the possible range (95% confidence interval) of the "true" EPDs for both Bull A and Bull B, given their respective accuracies. Notice how much smaller the range is for Bull A compared to Bull B.

Genomic testing results in a higher accuracy and helps reduce the risk to the buyer. Producers can confidently purchase a calving ease bull with GE-EPDs knowing the seedstock producer has done everything possible to ensure he is indeed a calving ease bull.

Accuracies are the second-most



On top of aligning an animal's EPDs with your breeding objectives, look for bulls with the AHA GE-EPD logo to ensure the utmost confidence in the bulls you purchase.

important number to consider when selecting a bull for purchase. As previously mentioned, EPDs are an estimate based on the information available to the genetic evaluation at the time. As more information is reported, whether it is

phenotype records or DNA, that estimate can move up or down as the accuracy of the prediction increases. However, the amount of potential movement decreases as the accuracy increases.

Risk vs. Reward

Unfortunately, increased accuracy of an EPD does not equate to better genetic potential. Just as often as an EPD for a trait will increase as a result of genetic testing or additional phenotype information, it is as likely to decrease. It is most beneficial to purchase bulls that already have a genomic profile added to the evaluation. The added genomic information is equivalent to 2 to 17 progeny records or a 7% to 17% increase in accuracy. Depending on the trait, a genomic test can add almost an entire calf crop worth of information to the prediction, reducing the likelihood of an EPD shifting over time.

Commercial bull buyers, however, should ask themselves what the value of that increased confidence is to them. Yes, increased accuracy reduces the risk of the EPD changing over time, but that must always be balanced with the EPD

of the animal and how much risk you're willing to take.

For example, if there are two bulls being considered, one with a Weaning Weight (WW) EPD of +68 lbs (top 5% of the breed) and another with a WW EPD of +58 lbs (top 30% of the breed) and a genomic profile on file, which would you choose? A more risk averse person would likely prefer to purchase the second bull with the lower WW EPD because they are more confident in the certainty of the prediction, while a producer who is willing to accept a bit more risk would see the value in purchasing the first bull understanding that 30 calves at +10 lbs of WW is about 300 pounds of added value, assuming the EPD prediction doesn't change over time. This is the push and pull of understanding the value of the information available to you and being able to use it as a tool to make more informed decisions.

On the other hand, there may be producers reading this article who, like a lot of America right now, are having a hard time finding help for the upcoming spring calving season. Anticipating this issue to continue, going into this bull sale season producers know they will likely be responsible for most, if not all, night checks and any needed calving intervention. What is the value of increased accuracy for a trait like BW or CED? Looking back at Figures 2 and 3, that increased confidence may make all the difference to your bull purchasing decision.

In my opinion, a bull with a genomic test is more advantageous than one without because of the large leap in confidence we see in the accuracy (7% to 17%). The true take-home message is to not split hairs over small differences in EPD value, especially as a result of a few progeny records being added to the evaluation on older, proven bulls. As with anything, the values placed on these animals are a tool to help provide insight and expectation to an otherwise unknown outcome. It is up to you to decide what value you place on specific pieces of the puzzle and how much change or risk you're willing to accept. **HW**

Editor's note: Jamie T. Courter, Ph.D., is a beef product manager for Neogen®.